

Research on the Utilization of Mathematics Network Curriculum Resources in Rural Middle Schools

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ABSTRACT

Mathematics resources are the core elements of mathematics curriculum. With the development of information-based education in China, the mathematics network resources in primary and secondary schools have moved from construction to utilization. However, the network curriculum resources in rural middle schools have some problems such as waste of resources and low utilization efficiency. We should pay attention to it and explore the truth behind it, so as to better promote the development of rural education. Mainly through the questionnaire survey and field observation of mathematics teachers in 20 rural middle schools in Liaoning Province. The survey results show that the network resources in rural middle schools are not well guaranteed, and most teachers have some problems, such as cognitive bias and narrow understanding of mathematics teaching materials. In order to solve the above problems, this study puts forward relevant suggestions in order to provide development references for rural education.

Keywords: rural middle school, Network course resources, utilize

1. RESEARCH PURPOSE

Network curriculum resources refer to the materials and materials developed and produced by information technology and used in curriculum teaching with the Internet as the platform and computer software as the tool in the whole curriculum design, implementation and evaluation. These materials are presented in various forms (such as video, audio and pictures), integrating visual and sensory effects [1]. The network curriculum resources of mathematics refer to the use of network curriculum resources to carry out various mathematics teaching and learning activities in the process of mathematics curriculum development, so as to realize the overall development of mathematics knowledge and skills, processes and methods, emotional attitudes and values. The organization and presentation of online mathematics curriculum resources not only helps to stimulate students' interest in learning, but also the most effective means to cultivate students' mathematics literacy. The network curriculum resources of mathematics in rural junior middle school refer to use of network curriculum resources of mathematics, such as digital video, digital audio, digital animation and other network resources, in the process of compiling mathematics curriculum rural junior middle school.

The role of network resources in mathematics curriculum has been increasingly realized. The Chinese government has issued a series of measures to promote the development of online curriculum resources in primary and secondary schools. For example, in 2019, the State Council issued China's Educational Modernization 2035, which advocates the establishment of a digital educational

resources co-construction and sharing mechanism [2] and so on. China's basic education informatization has also reached a turning point - from "infrastructure construction period" to "information technology application period".

However, the construction of online curriculum resources is still in the exploratory stage, and there are many problems in practical utilization that are worth studying, especially in rural middle schools. The rural middle school stage is the key link between the preceding and the following in the rural basic education, which is to undertake the high school and connect the primary school. Students in this period are in a special period both psychologically and physiologically. Pay attention to the connection between education and teaching in rural junior middle school. However, due to the influence of rural economic development, China's rural middle schools are short of educational resources. There are many disadvantages in the utilization of mathematics network curriculum resources. As a result, it is difficult for mathematics teachers in some rural areas to carry out classroom teaching, which ultimately affects the efficiency and quality of classroom teaching.

Therefore, the outstanding problems of rural middle school teachers in the utilization of mathematics network curriculum resources are studied in depth, so as to provide targeted guidance for the utilization of mathematics network curriculum resources in rural middle schools. This will help to improve the quality and level of mathematics curriculum in rural middle schools, promote the balanced development of urban and rural school education, and realize the fairness of compulsory education.

2. RESEARCH METHOD AND PROCESS

In this study, stratified sampling survey method was adopted, and the electronic questionnaire was made by "Questioning Stars" and published and recycled online. The survey objects are mostly concentrated in Anhui and Liaoning, mainly rural middle school math teachers. A total of 8 middle schools were investigated, 200 questionnaires were distributed, and 200 questionnaires were collected, with a recovery rate of 100%. According to the returned questionnaire: There were 5 invalid questionnaires and 195 valid questionnaires, and the effective rate was 97.5%.

2.1. Reliability Test

"Reliability is the reliability of a questionnaire, that is, the consistency and reliability of the test results of a questionnaire." [3] The Likert Five-point Scale was used in the questionnaire, which assigned "very important", "important", "general", "unimportant" and "very unimportant". It is divided into "5", "4", "3", "2" and "1" respectively. Cronbach α coefficient estimation method was used to calculate the reliability. "It is generally believed that: for the total scale, when the coefficient is greater than 0.8, the reliability is high; For the sub-scale, a coefficient between 0.7 and 0.8 indicates high reliability, and a coefficient between 0.6 and 0.7 indicates good reliability" [3]. Input the data into SPSS26.0 for analysis. and find that the internal consistency coefficient of the total table is 0.921 (see Table 1), which shows that the questionnaire has high reliability.

Table 1. Reliability Test Of The Questionnaire

<i>Cronbach's Alpha</i>	<i>Cronbach's Alpha Based on Standardized Items</i>	<i>N of Items</i>
.921	.889	104

2.2. Questionnaire Validity Analysis

Questionnaire validity refers to "The degree of accuracy and effectiveness of questionnaire measurement and investigation, that is, an evaluation of the accuracy of the content to be investigated by a questionnaire, which can usually be divided into content validity and structural validity. KMO test and Bartley sphere test are needed. in which KMO test coefficient is above 0.9, which is very suitable for factor analysis; Between 0.8-0.9, which is very suitable; Between 0.7-0.8, it is suitable; It is acceptable between 0.6 - 0.7, and the questionnaire has structural validity only when the p value is < 0.05 [3]. By analyzing the collected data with the help of SPSS26.0, it is found that the KMO test coefficient is 0.603 (see Table 2) and the P value is 0, which shows that the reliability of this questionnaire is high.

Table 2. Questionnaire KMO and Bartlett Test

<i>Kaiser-Meyer-Olkin Measure of Sampling Adequacy.</i>		.903
Bartlett's Test of Sphericity	Approx. Chi-Square	52.894
	df	15
	Sig.	.000

3. RESEARCH RESULTS AND CONCLUSIONS

3.1. Research Results

3.1.1. Cognitive aspects

According to the survey results, 70% of rural junior high school mathematics teachers don't know enough about the writing intention of mathematics textbooks, which makes the selection of mathematics network resources not closely related to junior high school mathematics textbooks. 85% of mathematics teachers don't know enough about rural middle school students' mathematics learning in the utilization of mathematics network curriculum resources. We can not well deal with the relationship between junior high school mathematics learning content and rural junior high school students' real life. In the cognitive aspect of the integration of information technology and mathematics curriculum, 68% of teachers think that information technology is an auxiliary teaching, lacking the integration with mathematics curriculum resources and so on. As a result, the unreasonable and inefficient use of mathematics network curriculum resources; The network curriculum resources of mathematics can't adapt to the mathematics learning ability of rural middle school students, and the development of network curriculum resources of mathematics is not perfect. This has a great negative impact on the teaching practice of rural mathematics teachers.

3.1.2. Use of teaching materials

According to the survey results: (1) 78% of rural middle school math teachers simply "flip" the math textbooks with the help of network technology, turning the contents of the math textbooks into presentations, without fully digging the contents of the math textbooks, which makes the math teaching become "mechanical" teaching. (2) 74% of rural middle school mathematics teachers even simply choose some online curriculum resources related to the content of junior middle school mathematics textbooks, and do not deeply interpret, process and deal with the content of textbooks, thus affecting the efficiency and quality of classroom teaching. (3) In the content presentation of mathematics textbooks, 54% of rural middle school

mathematics teachers pay more attention to the knowledge content in textbooks. Little attention is paid to mathematics, mathematics literacy, etc., which submerges students in the huge question bank of mathematics network resources. This kind of mathematics education is lifeless education.

3.1.3. Guarantee conditions

In 2020, the Ministry of Education will make statistics on the network resources infrastructure of urban, township and rural middle schools in China from 5 aspects: PC-room, PC (Set), classrooms, classrooms: of Which: General Classroom (Room), Schools No: Establishing Campus Network and Schools No: Access the Internet. Through the comparison of statistical data, it is found that: (1) the PC-room in middle schools in towns accounts for the largest proportion, and the PC-room in rural middle schools is almost one third of that in towns. Half of secondary schools in urban areas; (2) The total PC (Set) owned by junior middle schools in urban areas and towns is comparable, while rural middle schools are far behind

the former, accounting for only about 1/4 of the towns. The number of tablets in these three schools is generally less, while rural middle schools are still the lowest, and urban middle schools are about 5 times that of rural middle schools; (3) As far as the number of network multimedia classrooms is concerned, junior middle schools in township areas have a slight advantage. There are only about 220,000 rural middle schools; (4) The situation of classrooms with multimedia devices in of Which: General Classroom (Room) in urban areas, towns and rural middle schools is the same as above; (5) The total number of middle schools with campus network and Internet access is lower than that of the first four network resources infrastructure equipment, among which the number of middle schools with campus network is the lowest, and middle schools in towns are far ahead of urban and rural middle schools. The construction of rural campus network is particularly weak. See table 1 for details. To sum up, there is still a big gap between rural middle schools' network resources infrastructure and urban and township middle schools, which should be paid attention to.

Table 3. Basic Information Of Network Resource Infrastructure Of National Middle Schools[4]

	PC-room	PC (Set)			of Which: General Classroom (Room)		Schools No: Establishin g Campus Network	Schools No: Access the Internet
	unit:m2	of Which: No. of Computers Used for Instruction			Total	Network Multimedia Classroom		
		Total	Subtotal	Tablet PC				
Total	12740751.49	9567735	7993928	758190	1518432	1275915	40871	52374
Urban Area	4443877.16	3932538	3307564	430122	541127	1275915	12119	13758
Counties and Towns Area	6087637.41	4177459	3499747	247783	713695	587132	18886	24460
Rural Area	2209236.92	1457738	1186617	80285	263610	202023	9866	14156

3.2. Research Conclusion

3.2.1. Cognitive bias

Cognitive bias is a phenomenon that people often distort their perception results due to their own or situational reasons when they perceive themselves, others or the external environment [5]. Teachers are influenced by other factors, such as others or themselves, in the process of teaching, so they fail to grasp the essence of mathematics network curriculum resources. The main reason is that teachers' professional ability is insufficient. Mainly manifested in:

(1) In terms of teaching ability, although the utilization of mathematics network curriculum resources has been

expanded and extended to some extent, because of the weakest teaching staff in rural schools, teachers' teaching ideas, teaching behaviors and teaching reflection levels are lower than those in urban schools, which can not meet the actual needs of mathematics teaching in rural schools. (2) From the perspective of teachers' demand for their own professional development, Rural school teachers are obviously lacking in the cognitive level of mathematics, as well as in the level of mathematics teaching knowledge, mathematics knowledge and teaching reflection. (3) In the application of information technology, the habit and ability of rural middle school mathematics teachers to use information technology are weak. The construction of network resources is closely related to the professional development level of mathematics teachers.

3.2.2. Narrowness of mathematics teaching materials

In the network age, teaching materials are no longer limited to textual curriculum resources in the traditional sense, and their connotation and extension are constantly enriched and expanded. Besides paper textbooks, they also include electronic textbooks, multimedia-assisted teaching wall charts, audio-visual videos and computer-assisted teaching software which are matched with textbooks.[6] Various forms of network resources. Mathematics textbook is an important resource of rural junior high school mathematics curriculum. However, the use of mathematics textbooks by rural junior middle school teachers is limited to using them as textual resources. Ignore the teaching materials in the form of network. In the era of "internet plus", teachers should make full use of network resources to expand the content of textbooks and supplement textual textbooks.

3.2.3. Inadequate safeguards

"If you want to do well, you must sharpen your tools." The full use of online mathematics curriculum resources can not be separated from the related guarantee conditions and measures. Affected by rural economy and region, although the Chinese government has invested heavily in the construction of network resources. However, the network resources and equipment of rural middle schools still lag behind those of urban schools. At the same time, teachers' training on the use of mathematics network curriculum resources and information technology is slightly insufficient; Lack of evaluation mechanism of rural junior middle school mathematics network curriculum resources use; The imperfect management system of online mathematics curriculum resources. Without good material guarantee, it is difficult to utilize the network curriculum resources in rural middle schools.

4. IMPROVEMENT STRATEGY

4.1. Improve One's Own Professional Ability

In order to improve the quality and level of mathematics curriculum in rural junior middle schools, rural middle school mathematics teachers should first renew their ideas, strengthen their understanding of mathematics network curriculum resources, and raise their awareness of mathematics knowledge and content, so that mathematics education can become a part of teachers' professional development. Secondly, Rural junior middle school teachers need to strengthen the consciousness and ability of self-construction of mathematics network curriculum resources. The selection of mathematics network resources should closely follow the mathematics curriculum standards, return to the cognitive development

level and real life of rural middle school students, and carry out targeted teaching. Finally, continuously deepen and expand the application of information technology. At the same time, the rural teachers' mathematics literacy and information literacy should be constantly strengthened, so as to promote the integration of information technology and mathematics curriculum.

4.2. In-depth Mining of Mathematics Textbooks

Textbooks are an important carrier for the development of online curriculum resources. Only by deeply analyzing the textbooks can teachers develop online curriculum resources under the guidance of curriculum standards. Teachers can regenerate resources through the network platform and reorganize the network resources according to their own teaching practice. In this process, Not only enrich students' access to teaching materials, but also integrate their own curriculum resources with teaching content, so that the inherent logicity and logicity of teaching content can be fully exerted.

In the process of mathematics teaching, teachers should give full play to the "educational value" of mathematics textbooks and make reasonable choices of mathematics textbooks. In the process of using mathematics textbooks, teachers should constantly make selective adjustments to the textbooks, so that the mathematics textbooks are more in line with the learning psychology of rural middle school students and closer to their life experience. Make it adapt to the study and development of rural middle school students. For example, when explaining the combination of numbers and shapes, teachers can ask students to collect some information about the combination of numbers and shapes on the Internet to understand the mathematical principles. And look up life stories about the combination of numbers and shapes on the Internet, so that students can fully experience the fun of mathematics and stimulate their excitement in mathematics learning. Teaching materials are the basis of developing network course resources construction, but they are not the only reliance. Rural junior high school mathematics teachers should not neglect the use of other types of network curriculum resources which are in line with the learning characteristics of local rural junior high school students in mathematics curriculum development.

4.3. Increase Funding

China's government needs to continuously increase the investment of network infrastructure in rural middle schools, strengthen the construction of digital campus in rural middle schools, improve the digital management and evaluation mechanism, and provide basic material support for rural mathematics teachers to use network mathematics curriculum resources. Secondly, Schools should strengthen the training of rural middle school mathematics teachers in

the use of network resources and the application ability of information technology. Teacher training in rural areas should be consistent with the knowledge reserve and teaching skills of rural middle school mathematics teachers, meet the needs of rural teachers' professional development, and provide ability guarantee for rural middle school teachers to use network mathematics curriculum resources. Finally, Teachers should pay attention to the collection and management of educational data to provide data support for the utilization of network mathematics curriculum resources. Collect the data of rural middle school students' mathematics learning, and adopt targeted teaching. In this way, students' mathematics emotion, mathematics learning motivation and interest can be stimulated, and the utilization efficiency of mathematics network course resources can be maximized.

5. CONCLUSION

In a word, network resources have become a "soft power" that will influence the future development of education in the world, and the construction of network resources in rural schools has also become a major issue to be solved urgently. While developing the network curriculum resources of mathematics in rural middle schools, we should pay more attention to the utilization of network curriculum resources of mathematics in rural middle schools. Avoid becoming a "digital ruin". We should give full play to the role of network curriculum resources in the mathematics curriculum development of rural middle schools and promote the curriculum development of rural middle schools in China.

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